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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/642,699

08/19/2003

Eiichi Murakami

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07/28/2004

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EXAMINER

FULLER, RODNEY EVAN

ART UNIT

PAPER NUMBER

2851

DATE MAILED: 07/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/642,699

Applicant(s)

MURAKAMI ET AL.

Examiner

Rodney E Fuller

Art Unit

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 25-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 25-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

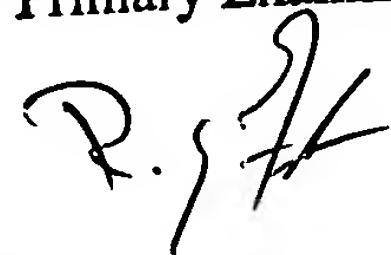
- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☒ Certified copies of the priority documents have been received in Application No. 09/533,377.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Rodney Fuller
Primary Examiner



Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 08/19/04.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 25-34 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Suzuki (US 5,898,501) (See 103 rejection below).

Suzuki discloses all the structure set forth in the claims. Regarding claim 25, Suzuki discloses an illumination optical system (column 1, lines 9-12) for illuminating a pattern of a first object, with use of exposure light from an exposure light source; a projection optical system (column 1, lines 9-10) for directing the exposure light, emitted from the pattern, onto a second object; and an interferometer (column 2, line 42) for measuring an optical characteristic (column 2, line 23) of said projection optical system, on the basis of interference produced by use of light emitted from an interference light source separate from the exposure light source (column 6, lines 18-21)."

Regarding claim 26, Suzuki discloses a "means for detecting a curvature of field (column 3, line 16) of said projection optical system, by use of said interferometer."

Regarding claim 27, Suzuki discloses a "means for detecting an aberration (column 3, lines 14-16) of said projection optical system, by use of said interferometer."

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Regarding claim 28, Suzuki discloses “wherein said interference light source is a light source which emits light having a wavelength of at least one of 496 nm and 363.8 nm (column 6, line 19).”

Regarding claim 29, Suzuki discloses “wherein said interference light source is an argon laser (column 6, line 17).”

Regarding claim 30, Suzuki discloses a “means for correcting a state of aberration of said projection optical system, on the basis of the measurement made by use of said interferometer.” (column 3, lines 49-51)

Regarding claim 31, Suzuki discloses an “adjusting means for adjusting an amount of aberration of said projection optical system, into a desired state.” (column 3, lines 49-51)

Regarding claim 32, Suzuki discloses a “driving means for moving an optical element of said projection optical system, on the basis of the measurement made by use of said interferometer.” (column 3, lines 49-51)

Regarding claim 33, Suzuki discloses a “means for determining whether the operation of said apparatus should be discontinued, on the basis of the measurement made by use of said interferometer.” (column 3, lines 45-49)

The method step of claim 34 is met by the operation of Suzuki as applied to claims 1-33.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 25-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (US 5,898,501) in view of Tokuda, et al. (US 5,995,263).

Suzuki can be interpreted as disclosing all the structure set forth in the claims (See 102 rejection above). Alternatively, Suzuki can be interpreted as only an apparatus that tests the lens (i.e., projection optical system) used in a projection apparatus.

Suzuki discloses an apparatus for measuring the wavefront aberrations of a microprojection lens. Thus, Suzuki clearly teaches “projection optical system for directing” exposure light from a pattern onto a second object, and “an interferometer for measuring an optical characteristic of said projection optical system, on the basis of interference produced by use of light emitted from an interference light source separate from the exposure light source.” Though Suzuki also discloses “an illumination optical system (column 1, lines 9-12) for illuminating a pattern of a first object, with use of exposure light from an exposure light source,” it is anticipated that the applicant will argue that Suzuki is not teaching or claiming a projection exposure apparatus that includes “an illumination optical system for illuminating a pattern of a first object,” “a projection optical system,” and “an interferometer” as a single unit. However, Tokuda teaches that it is routine in the art to include a through-the-lens type (TTL) optical system to evaluate the projection optical system in a projection optical system. Thus, it would have been obvious to one of ordinary skill in the art to utilize the apparatus (interferometer) taught by Suzuki in a projection exposure apparatus (illumination optical system with projection optical system) as described in Tokuda. The ordinary artisan would have been motivated to

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utilize the apparatus taught by Suzuki in the exposure apparatus taught by Tokuda (i.e., to modify Tokuda to include the interferometer system as taught by Suzuki) in order to monitor and correct for aberrations during the performance of the exposure system which may be caused by heat deformation of a lens absorbing light. (See Tokuda, column 1, lines 30-36)

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Sano (US 5,969,799) discloses and claims "an exposure apparatus comprising a means for illuminating a mask with a light from an excimer laser; and a projection optical system for projecting a pattern of the mask onto a substrate with the light from the excimer laser, wherein optical performance of said projection optical system is measured by forming an interference fringe, containing information related to aberration of said projection optical system, by use of a secondary harmonic wave of a laser separate from said excimer laser, and then by analyzing the interference fringe, and wherein the light from the excimer laser has a wavelength corresponding to that of the harmonic of the laser separate from the excimer laser," which corresponds to the limitations of claim 1.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Rodney E Fuller whose telephone number is 571-272-2118. The examiner can normally be reached on 8:00am - 4:30pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on 571-272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Rodney E Fuller
Primary Examiner
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A handwritten signature in black ink, appearing to read 'R. E. Fuller', is written over the printed name of the examiner.

July 14, 2004